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Building & Highway Material Testing Laboratory

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Job No.: CTCE/BBMP/W.No.06/TBMK/WMM/Gradation/2014-15 05.09.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.

Name of Work : Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.

Reference : AEE/BTP/WO/62/2014-15 Dated: 03.09.2014

Date of Testing : 05.09.2014

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): 25200

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	895	895	3.6	96.4	95-100
22.4	5420	6315	25.1	74.9	60-80
11.2	5560	11875	47.1	52.9	40-60
4.75	4015	15890	63.1	36.9	25-40
2.36	3860	19750	78.4	21.6	15-30
0.600	2490	22240	88.3	11.7	8-22
0.075	2575	24815	98.5	1.5	0-8

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Job No.: CTCE/BBMP/W.No.06/TBMK/SDBC/Bitumen/2014-15 15.09.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.
NAME OF THE WORK	Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
REFERENCE	AEE/BTP/WO/62/2014-15 Dated: 03.09.2014
SAMPLE I/D	Roads and Drains at Saraipalya Main Road and Cross Roads in Ward No.06.
DATE OF TESTING	15.09.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477	472
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23	28.00
7. Bitumen content in %	4.60	5.60
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	34.12	7.15	7.15	92.85	90-100
4.75	262.3	54.99	62.14	37.86	35-51
2.36	51.14	10.72	72.86	27.14	24-39
1.18	42.25	8.86	81.72	18.28	15-30
0.3	29.65	6.22	87.94	12.06	9-19
0.075	22.25	4.66	92.60	7.40	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	27.4	5.48	5.48	94.52	90-100
4.75	259.6	51.92	57.40	42.60	35-51
2.36	85.42	17.08	74.48	25.52	24-39
1.18	47.28	9.46	83.94	16.06	15-30
0.3	25.48	5.10	89.04	10.96	9-19
0.075	20.78	4.16	93.19	6.81	3-8

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Job No.: CTCE/BBMP/W.No.06/TBMK/WMM/AIV/2014-15

05.09.2014

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.
Name of the Work	Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE/BTP/WO/62/2014-15 Dated: 03.09.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	05.09.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines	21.47	22.28	
	100* (W_2/W_1)%			21.87

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/TBMK/WMM/S-T/2014-15 05.09.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.
Name of Work	Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE/BTP/WO/62/2014-15 Dated: 03.09.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	05.09.2014

Result : Flakiness Index = **11.96%**

Elongation Index = **13.58%**

Result : Combined Flakiness & Elongation index **25.54%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/TBMK/SDBC/AIV/2014-15 15.09.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.
Name of the Work	Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE/BTP/WO/62/2014-15 Dated: 03.09.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete .
Date of Testing	15.09.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	87	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.73	22.54	22.13

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.06/TBMK/SDBC/Shape_T/2014-15 15.09.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.
Name of Work	Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE/BTP/WO/62/2014-15 Dated: 03.09.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	15.09.2014

Result : Flakiness Index = **11.32%**

Elongation Index = **13.19%**

Result : Combined Flakiness & Elongation index **24.51%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.06/TBMK/SDBC/Stripping/2014-15 15.09.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.
Name of the work	Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE/BTP/WO/62/2014-15 Dated: 03.09.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	15.09.2014

Type of binder : 60/70
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.8	3.00	97.00
2	3.0		
3	3.2		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.06/TBMK/Sp_Wa/2014-15 15.09.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Mr. T.B. Mahesh Kumar,** Contractor, Bangalore.
Name of the Work	Improvements to Road and Drains at Saraipalya Layout in Ward No.06, Byatarayanapura Sub Division, BBMP, Bangalore.
Reference	AEE/BTP/WO/62/2014-15 Dated: 03.09.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	15.09.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2012	2013	2015	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1257	1258	1260	
4	Weight of saturated surface dry aggregate in air	W_3 g	2010	2012	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	753	754	755	
6	Weight of oven dried aggregate	W_4 g	2001	2004	2005	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.657	2.658	2.656	2.657
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.690	2.686	2.691	2.689
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.45%	0.40%	0.50%	0.45%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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